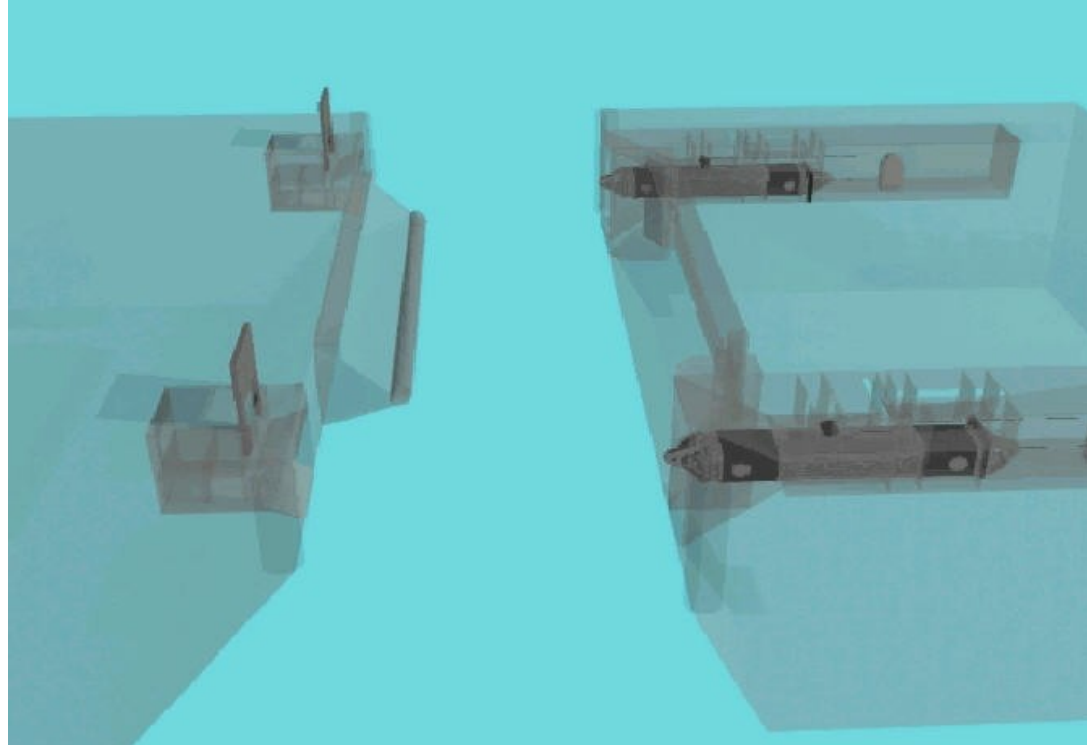


Improved Flexible Causeway Connector



Bill Hatch

Amphibious Systems Division

Naval Facilities Engineering Service Center, Port Hueneme, CA 93043-4370

1/29/02



OPERATIONS IN ELEVATED SEAS REQUIRE SUITABLE CONNECTORS



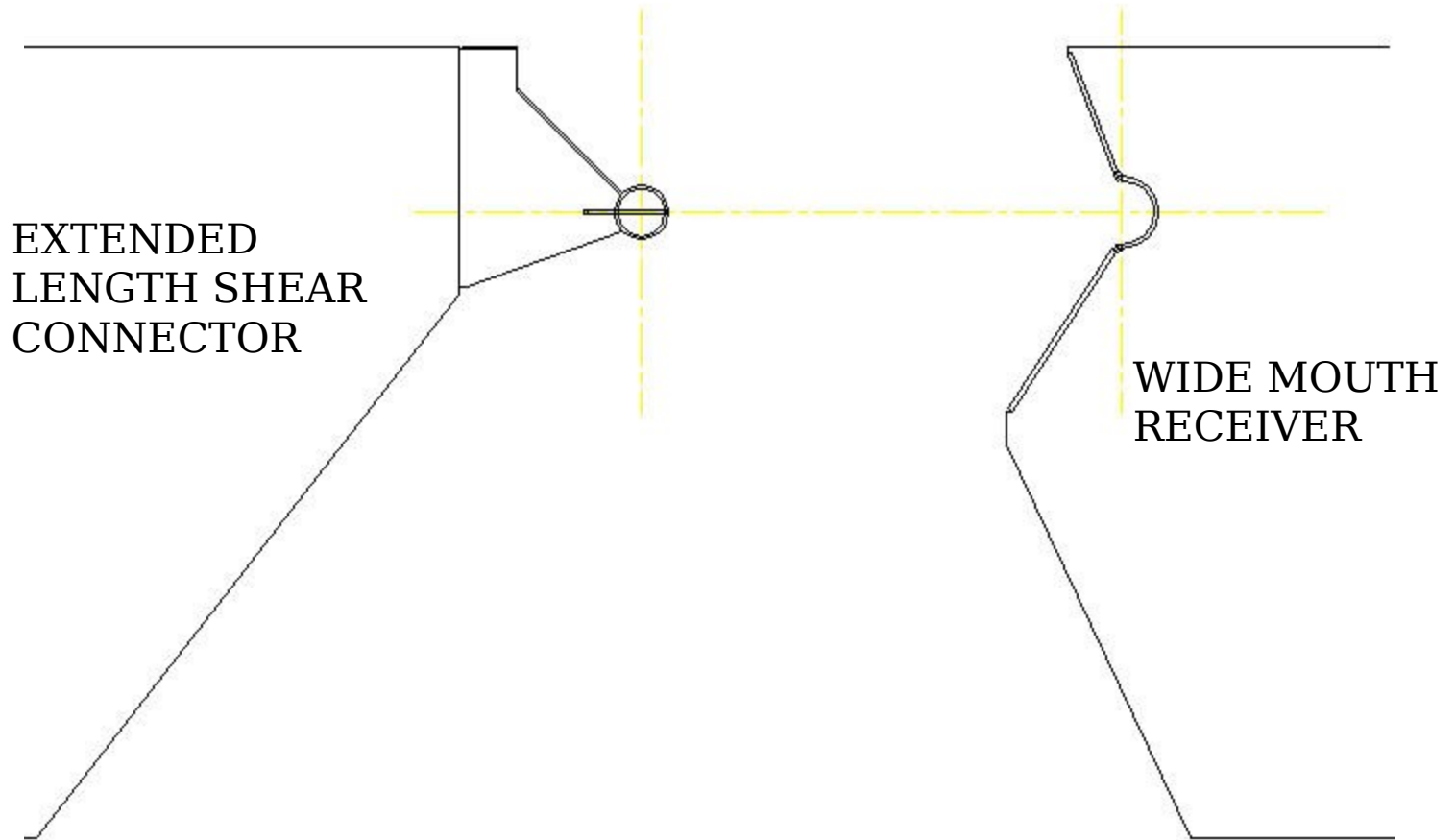


FLEXIBLE CONNECTOR DESIGN **BASIS**

1. A flexible connector is required if lengths > 160 ft.
 - Driven by loads and operational configurations
2. Adapt existing NL P-8 end connector to prototype assets
 - Pipe shear connectors
 - Flexor tensile connectors
3. Increase safety and efficiency
 - Reduce crew involvement in connections
 - Provide better alignment and engagement

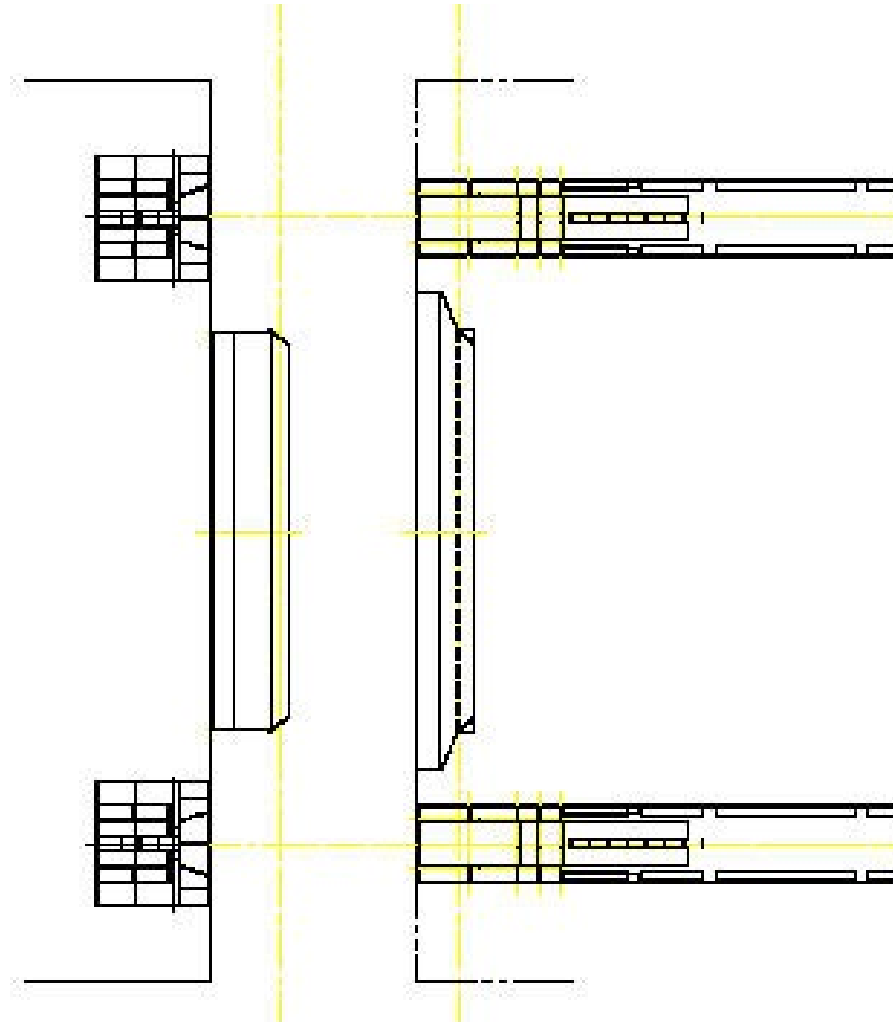


ALIGNMENT AND ENGAGEMENT IMPROVED SHEAR CONNECTOR GEOMETRY



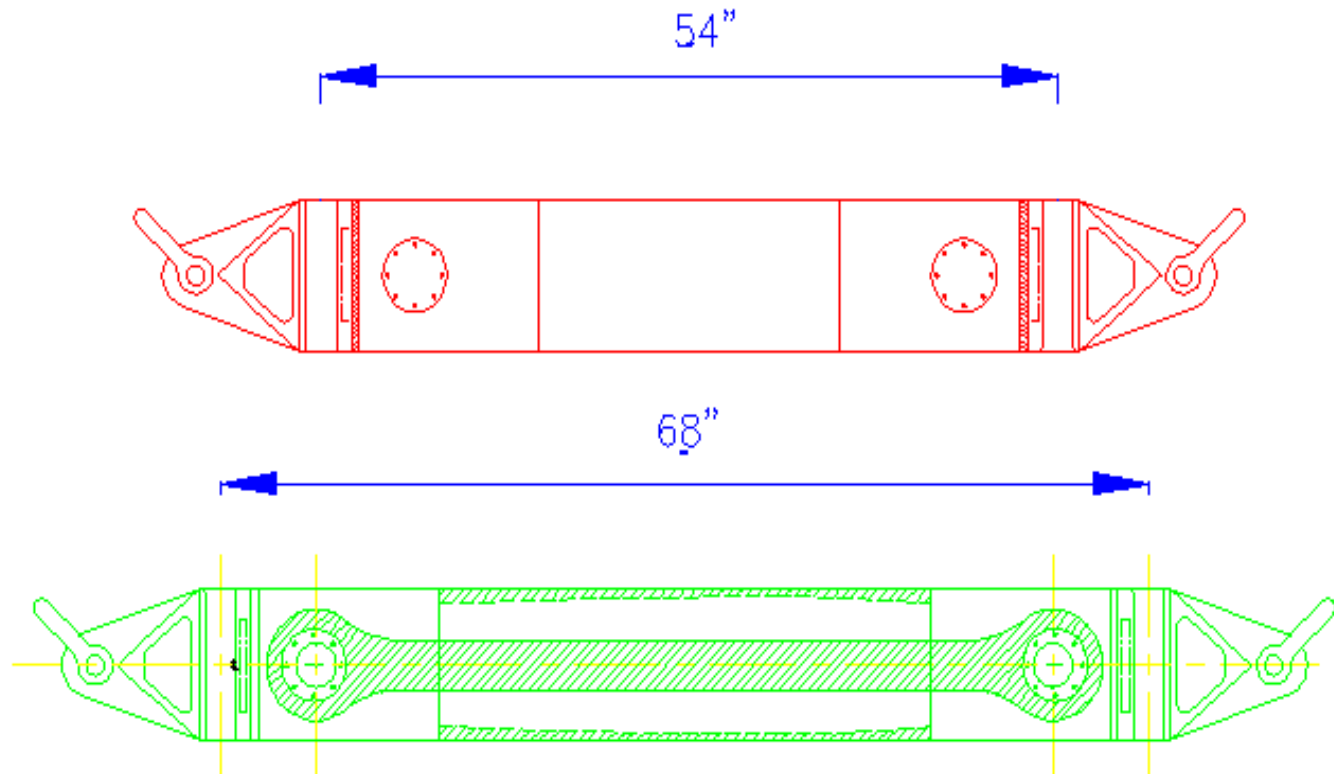


IMPROVED SHEAR CONNECTOR PLAN VIEW





NL FLEXOR AND SEABOSS FLEXOR



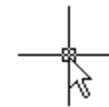
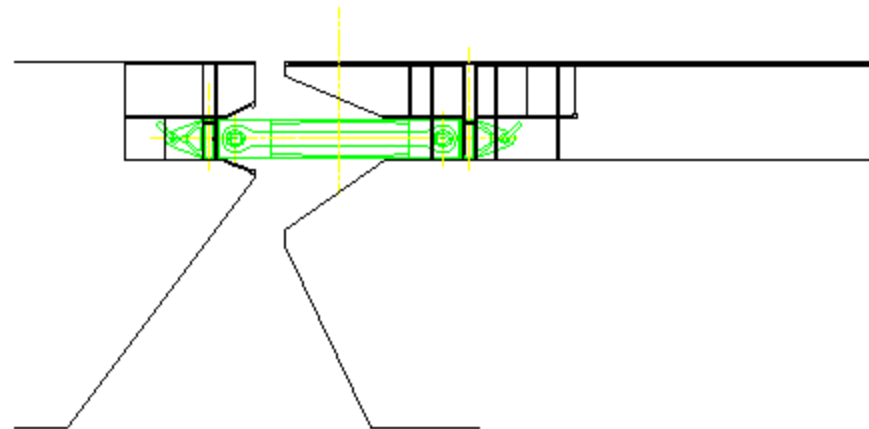
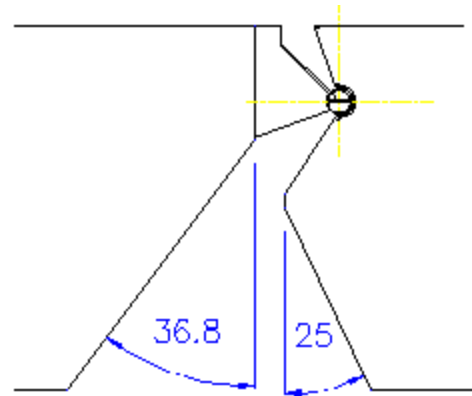


IMPROVED FLEXOR FABRICATION





SHEAR AND FLEXOR CONNECTIONS





SHEAR AND FLEXOR CONNECTIONS

Naval Facilities
Engineering Service
Center



LOCKING AND EXTENSION METHODS

Locking Methods

- Trigger Plate
- “Door Latch” guillotine

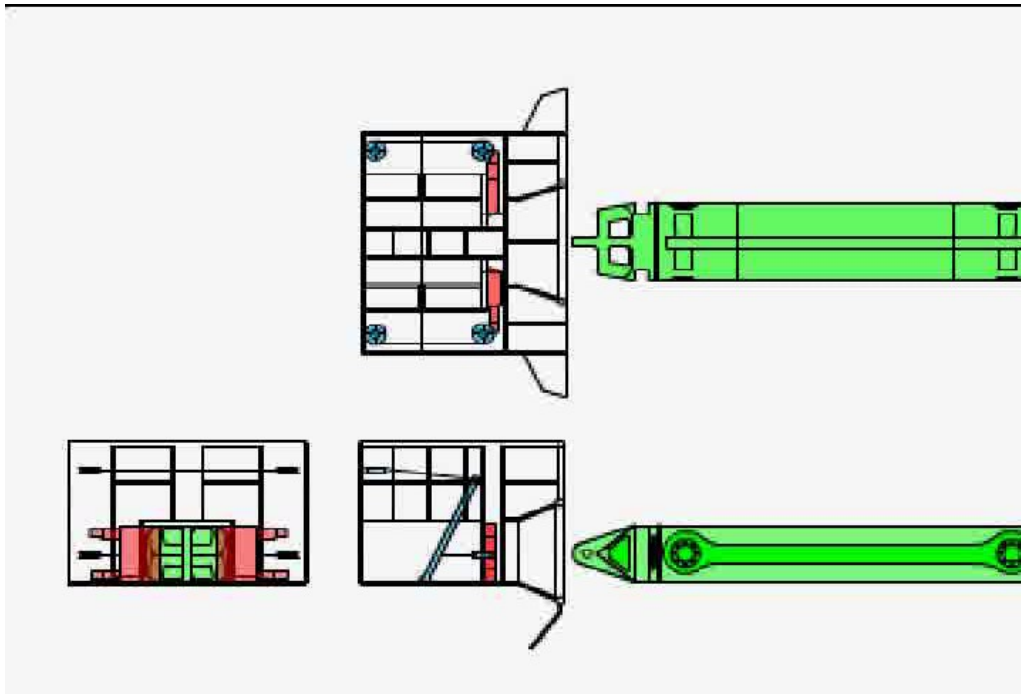
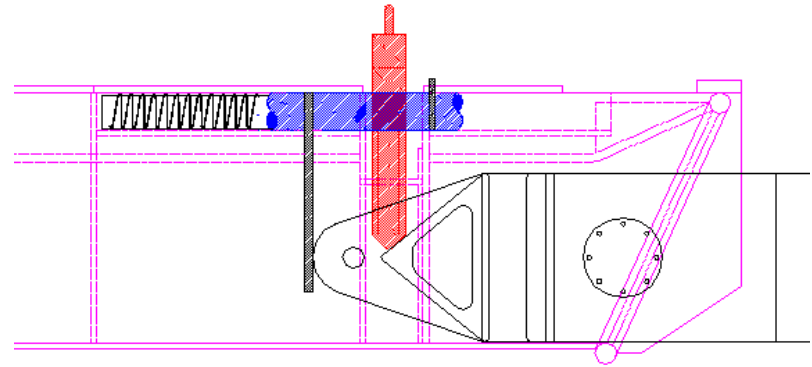
Extension Methods

- Air motor
- 12/24 volt electric winch
- Pneumatic cylinder
- Hand winch
- Pry bar



LOCKING METHODS

TRIGGER PLATE



SIDE LATCH



LOCKING METHODS

TRIGGER PLATE

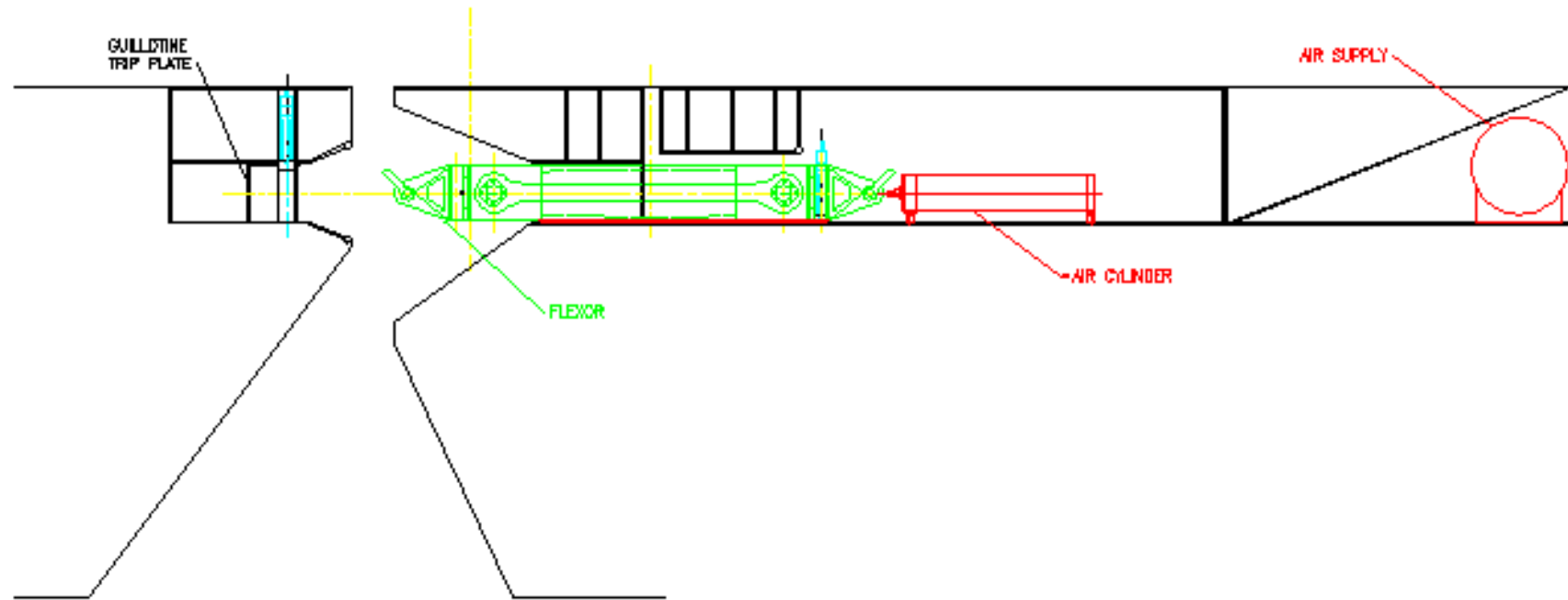


SIDE LATCH





EXTENSION METHODS



PNEUMATIC AIR CYLINDER (RETRACTED)



EXTENSION METHODS PNEUMATIC



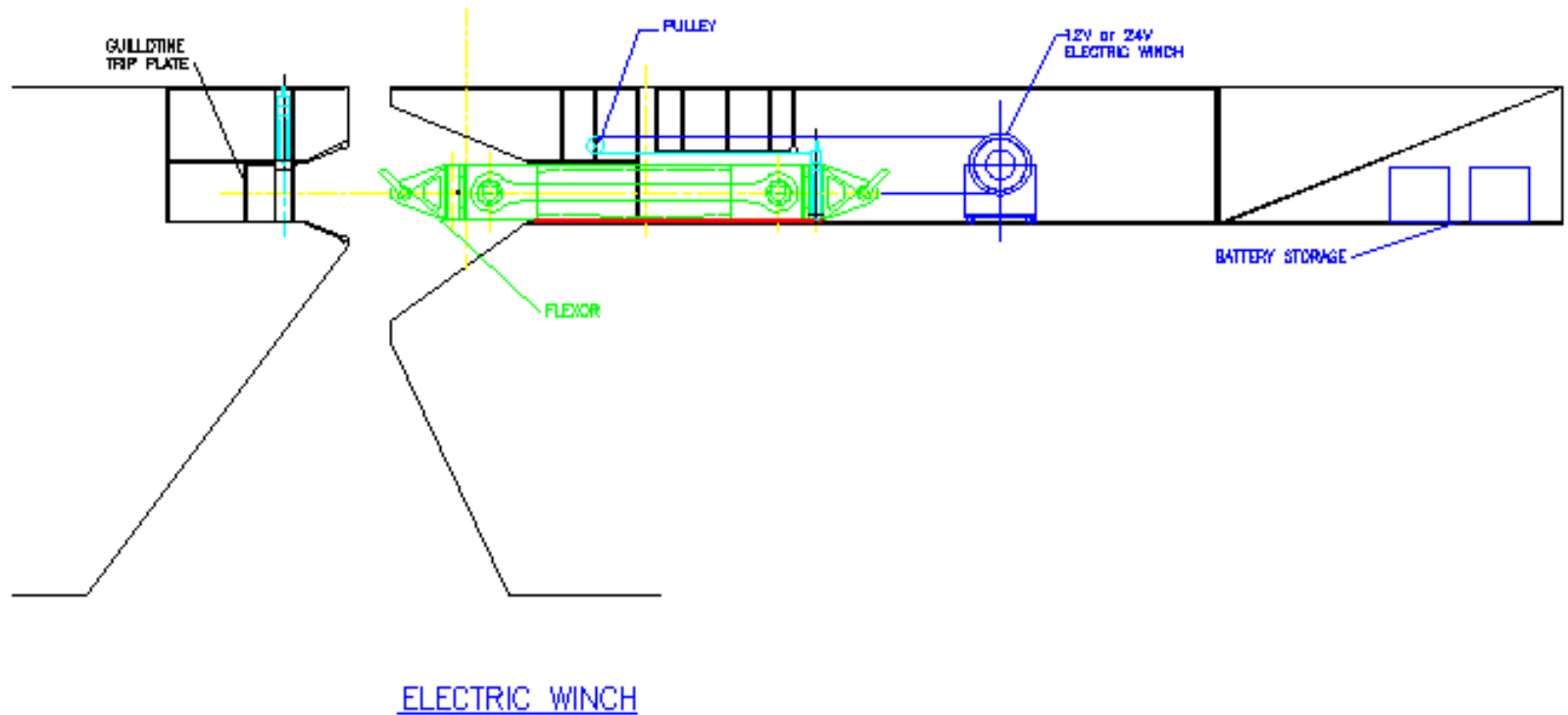


EXTENSION METHODS PNEUMATIC CYLINDER





EXTENSION METHODS





EXTENSION METHODS ELECTRIC WINCH





PROTOTYPE CONCEPT EVALUATION

1. Hardware to be delivered to Little Creek NAB
 - Modules – AAA and USCG
 - Flexor connectors
 - Extension and locking mechanisms
2. At-Sea testing in March-April timeframe
3. Incorporate recommended design modifications in procurement of replacement Navy lighterage
 - Platform-specific flexors
 - Durability / reliability testing